## FIGURE 1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVVLLLACLERAVAQTFGCSNTKINDQARKMFYDAHNDARRSMAKGLE PNKCGLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWGQNYATYM GSIADPLPYASMAVNGWWSEIRTVGLTDPDNKYTNSAMFRFANMANGKASAFG CAYALCAGKLSINCIYNKIGYMTNAIIYEKGDACTSDAECTTYSDSQCKNGLCYK APQAPVVETFTMCPSVTDQSDQARQNFLDTHNKLRTSLAKGLEADGIAAGAFAP MAKQMPKLVKYSCTVEANARTWAKGCLYQHSTSAQRPGLGENLYMISINNMP KIQTAEDSSKAWWSELKDFGVGSDNILTQAVFDRGVGHYTQMAWEGTTEIGCF VENCPTFTYSVCQYGPAGNYMNQLIYTKGSPCTADADCPGTQTCSVAEALCVIP

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTACTTCTAGCATGCCTGGAGAGAGCGGTTG CACAGACGTTCGGCTGCTCTAACACCAAGATCAATGACCAGGCTCGTAAGAT GTTCTATGATGCTCACAATGATGCAAGACGAAGCATGGCTAAAGGGCTTGAG CCAAACAAGTGCGGACTCTTATCTGGTGGAAAGAATGTTTATGAATTGAATT GGGATTGCGAGATGGAAGCAAAAGCTCAGGAATGGGCAGACGGATGTCCCA GCTCTTTCCAGACATTTGATCCAACATGGGGGCAGAACTACGCGACGTACAT GGGATCGATTGCTGATCCGCTTCCATACGCTTCCATGGCTGTTAATGGGTGGT GGTCGGAAATTAGAACCGTAGGACTTACGGATCCTGATAACAAGTACACTAA CAGTGCAATGTTCCGATTTGCTAATATGGCAAATGGTAAAGCTTCAGCTTTTG GATGTGCATACGCGTTGTGCGCAGGAAAACTATCCATCAATTGCATTTACAA CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAAGGAGATGCCTGT ACCAGTGACGCTGAATGCACCACCTACTCAGACTCACAATGCAAAAACGGTC TTTGCTATAAGGCACCTCAAGCTCCAGTCGTTGAGACTTTCACAATGTGCCCT TCGGTCACGGACCAGTCGGATCAGGCGCGTCAAAACTTCTTGGACACCCATA ACAAATTGCGTACAAGCCTTGCCAAGGGACTTGAAGCTGATGGAATTGCCGC TGGAGCATTTGCACCAATGGCCAAGCAAATGCCAAAACTGGTAAAATACAGC TGCACAGTTGAAGCAAACGCCAGAACATGGGCAAAAGGATGCCTTTACCAGC ATTCAACAAGCGCACAGAGACCAGGACTCGGTGAAAATCTTTATATGATCAG CATTAACAACATGCCTAAAATTCAAACCGCGGAGGACTCCTCAAAGGCTTGG TGGTCCGAGTTGAAAGACTTCGGAGTCGGTTCTGACAACATTCTGACCCAAG TACTGAAATTGGATGTTTTGTGGAGAATTGTCCAACATTCACTTATTCCGTAT GCCAATATGGTCCAGCGGAAACTACATGAACCAACTAATCTATACCAAGGG CTCACCATGCACAGCTGACGCCGATTGCCCAGGAACCCAGACATGCAGTGTC GCTGAAGCATTATGTGTTATCCCTTAGTAAATTTTCTATGCAACTCTTTGAAA GTCATAATAAATATGCAAAAATTAAAAAAAAAAAAAA

## FIGURE 1, cont.

VAP-2 amino acid sequence (SEQ ID NO:3)

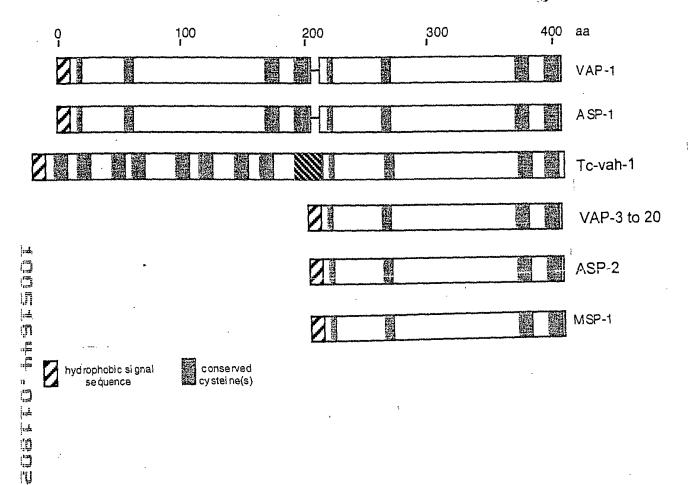
MNVVLSAVTLFLIFRYAQTVNIEGSGGNDELLEQNVWNDVDDKVVEALGGLDD ELLTEHVCNKSTITQLQQEIILTTHNELRRSLAFGKQRNKRGLMNGARNMYKLD WDCELASLAANWSTSCPQHFMPQSVLGSNAQLFKRFYFYFDGHDSTVHMRNA MKYWWQQGEEKGNEDQKNRFYARRNYFGWANMAKGKTYRVGCSYIMCGDG ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPGSKCLVPEGLCQAPSMV KDDGGSFQCDNSLVSDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM IKMEYDCMLERFAQNWANNCVFAHSAHYERPNQGQNLYMSSFSNPDPRSLIHT AVEKWWQELEEFGTPIDNVLTPELWDLKGKAIGHYTQMAWDRTYRLGCGIANC PKMSYVVCHYGPAGNRKNNKIYEIGDPCEVDDDCPIGTDCEKTTSLCVISK

vap-2 cDNA nucleotide sequence (SEQ ID NO:4)

ATGAACGTGGTCCTTTCCGCTGTCACTCTTTTTCTTATTTTTCGATATGCGCAG ACTGTGAATATAGAAGGCAGTGGAGGAAATGATGAGCTTCTTGAGCAGAACG TGTGGAACGATGTAGACGACAAGGTTGTAGAAGCACTTGGTGGTCTTGATGA TGAACTGCTAACCGAACATGTGTGTAACAAATCAACGATCACTCAGCTACAG CAGGAGATCATCTTGACAACCCACAATGAATTACGAAGATCATTGGCTTTCG GAAAGCAAAGAAACAAGAGAGGTCTCATGAACGGTGCGAGAAATATGTATA AACTGGATTGGGATTGTGAACTGGCATCACTTGCAGCCAATTGGTCAACCTCC TGCCCTCAGCACTTTATGCCGCAATCGGTACTTGGCTCCAACGCTCAGCTTTT TAAGCGTTTCTATTTTTATTTTGATGGGCACGACTCTACTGTACATATGCGAA ACGCGATGAAGTATTGGTGGCAGCAAGGTGAAGAAAAAGGCAATGAGGATC AGAAAAATAGATTCTATGCCAGACGAAATTATTTTGGATGGCCAAACATGGC AAAAGGAAAAACATATCGAGTTGGATGCTCGTATATTATGTGCGGCGACGGT GAATCTGCACTTTTCACTTGTCTTTATAACGAAAAAGCCCAATGCGAAAAAG AAATGATTTACGAAAATGGAAAACCCTGCTGTGAGGATAAAGACTGTTTCAC ATATCCAGGATCAAAATGTTTAGTACCTGAAGGATTATGTCAAGCACCTTCTA TGGTAAAGGATGATGGAGGAAGTTTCCAATGTGATAACTCCCTTGTGTCAGA TGTCACCCGCAATTTCACTTTGGAGCAACACAATTTTTATAGATCTCGTCTTG CAAAAGGTTTTGAATGGAATGGAGAAACAAACACTTCCCAGCCAAAGGCTAG TCAAATGATCAAAATGGAGTATGACTGCATGTTGGAACGGTTTGCACAAAAC TGGGCAAATAATTGCGTTTTTGCACACTCGGCACATTACGAAAGACCGAATC AGGGTCAGAATCTCTACATGAGTTCTTTCTCAAACCCTGATCCTAGAAGCCTT ATACATACGGCCGTCGAGAAGTGGTGGCAGGAATTGGAGGAGTTCGGTACTC CAATTGATAACGTTCTGACACCCGAATTGTGGGATTTGAAAGGGAAAGCGAT AGGACATTACACTCAGATGGCCTGGGATCGTACTTACCGTCTTGGTTGTGGAA TCGCAAACTGTCCGAAGATGTCGTACGTGGTTTGTCACTATGGGCCAGCAGG CAACAGAAAGAACAATAAAATCTATGAAATCGGGGATCCTTGCGAAGTCGAT GATGATTGCCCGATTGGAACAGATTGTGAAAAGACAACTTCTTTATGTGTGAT **CTCAAAATAA** 3355027\_1.DOC

2 of 2

FIGURE 2: Schematic diagram of nematode venom allergen protein domains



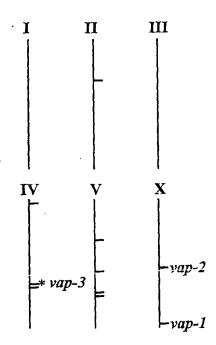
## FIGURE 3

CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

```
VAP-1 N
                 VAP-1 C
                                                                                                                                ----PQAPVVETFTM 11
 VAP-2 N
               <sup>1</sup> MNVVLSAVTLFLIFRYAQTVNIEGSGGNDELLEQNVWNDVDDKVVEALGGLDDE<sub>LLTEH</sub>V 60
              ASP-1 N
              ASP-1 C
 VAP-3
 MSP-1
               VAP-1 N
             23 CSNTKIN - - DQARKMFYDAHNDARRSMAKGLEPN - - KCGLLSGGKNVYELN - WDCEMEA 76
             12 CPSVT-DQSDQARQNFLDTHNKLRTSLAKGLEADGIAAGAFAPMAKQMPKLVKYSCTVEA 70
61 CNKST--ITQLQQEIILTTHNELRRSLAFGKQRN---KRGLMNGARNMYKLD-WDCELAS 114
4 CDNSLV--SDVTRNFTLEQHNFYRSRLAKGFEWNG-ETNTSQPKASQMIKME-YDCMLER 59
 VAP-1 C
 VAP-2 C
 ASP-1 N
             27 C.S.N.S.G. - I T D.K.D.R.Q.A.F.L.D.F.H.N.N.A.R.R.R.V.A.K.G.V.E.D.S. - - N.S.G.K.L.N.P.A.K.N.M.Y.K.L.S. - W.D.C.A.M.E.Q. 80

9 C.P.S.N.T. - G.M.T.D.S.V.R.D.T.F.L.S.V.H.N.E.F.R.S.S.V.A.R.G.L.E.P.D. - A.L.G.G.N.A.P.K.A.A.K.M.L.K.M.V. - Y.D.C.E.V.E.A. 64
 VAP-3
             14 CSADFG - - SSGQNGIINAHNTLRSKIAKGTYVA - - KGTQKSPGTNLLKMK - WDSAVĀA 66
15 IYTVVNSLTVPEQNAVVDCINKYRSQLANGKTKN - - KNGGNFFSGKDILEVS - YSKDLEK 71
 VAP-1 N
            77 KAQEWADGCPSSFQT - - FDPT - - - WGQNYATYMGSI - - ADPLPYASMAVNGWWSEIRTVG 129
71 NARTWAKGCLYQHSTSAQRPG - - LGENLYMISINN - - MPKIQTAEDSSKAWWSELKDFG 125
115 LAANWSTSCPQHFMPQSVLGS - - NAQLFKRFYFYFDGHDSTVHMRNAMKYWWQQGEEKG 171
80 FAQNWANNCVFAHSAHYERPN - - QGQNLYMSSFSN - PDPRSLIHTAVEKWWQELEEFG 144
 VAP-2 N
VAP-2 C
            81 Q L Q D A I Q S C P S A F A G - - - I Q G - - - V A Q N V M S W S S S G G F P D P S V K I E Q T L S G W W S G A K K N G 134
85 S A I R H G N K C V Y Q H S H G E D R P G - - - L G E N L Y K T S V L K - - F D K N K A A K Q A S Q L W W N E L K E F Q D Y G 120
86 S A Q N Y A N G C P T G H S G - - - D A G - - - L G E N L Y W Y W T S G S L G D L N Q Y G S A A S A S W E K E F Q D Y G 120
87 S A Q R W A N K C I F D H N G T D L Y S G G K F Y G E N L Y L D G D F E H - K N I T Q L M I D A C N A W W G E S T T D G 130
 ASP-1 N
 ASP-1 C
VAP-3
MSP-1
WAP-1 N
                                      - P D N K - - Y T N S A - - - M F R F A N M A N G K A S A F G C A Y A L C A G K L - - - - - S I N C I 172
           128 V G S D - - - N I L T Q A - - V F D R G - - - V G H Y T Q M A W E G T T E I G C F V E N C P T F T - - - - Y S V C Q 171
172 N E D Q - - - - - - K N R - - F Y A R R N - - Y F G W A N M A K G K T Y R V G C S Y I M C G D G E S - - - A L F T C L 217
115 T P I D - - - N V L T P E - - L W D L K G K A I G H Y T Q M A W D R T Y R L G C G I A N C P K M S - - - - Y V V C H 163
VAP-1 C
VAP-2 C
           135 V P P S W I N N F L P T D N K E N D E K F E A V G H W T Q M A W A K T Y Q I G C A L K V C H K P D C N G N - L I D C R 188
ASP-1 N
WAP-3
MSP-1
ľ
           173 YNKIGYMTNAIIYEKGDACTSDAECTTTYS - - DSQCKNGLCYKA - - . . . . 213
172 YGPAGNYMNQL:IYTKGSPCTADADCPGTQ - - TCSVAEALC'-V- IP - . . . . 212
218 YNEKAQCEKEMIYENGKPCCEDKDCFTYPGSKCLVPEGLCQAPSMVKDDGG288
VAP-1 N
VAP-1 C
VAP-2 N
           164 Y G P A G N R K N N K I Y E I G D P C E V D D D C P I G T - D C E K T T S L C - V - 1 S K - . - 205
177 Y N G V G Y I T N Q P M W E T G Q A C K T G A D C S T Y K - N S G C E D G L C T K G P - . - . - 218
169 Y G P G G N Y M G H V I Y T M G Q P C S - - Q C S P G A - T C S V T E G L C - S - A - . P - 206
172 Y K P Q G N F I N Q Y I Y V S G A T C S - - G C P S G T - S C E T S T G L C V - - - - . - . 207
 ASP-1 N
 ASP-1 C
VAP-3
MSP-1
           189 Y Y P G G N G M G S P I Y Q Q G K P A S - - - G C G K A G - - P S T K Y S G L C K P D P H Q N N - . - 231
```

FIGURE 4: Schematic map of selected C. elegans vap genes



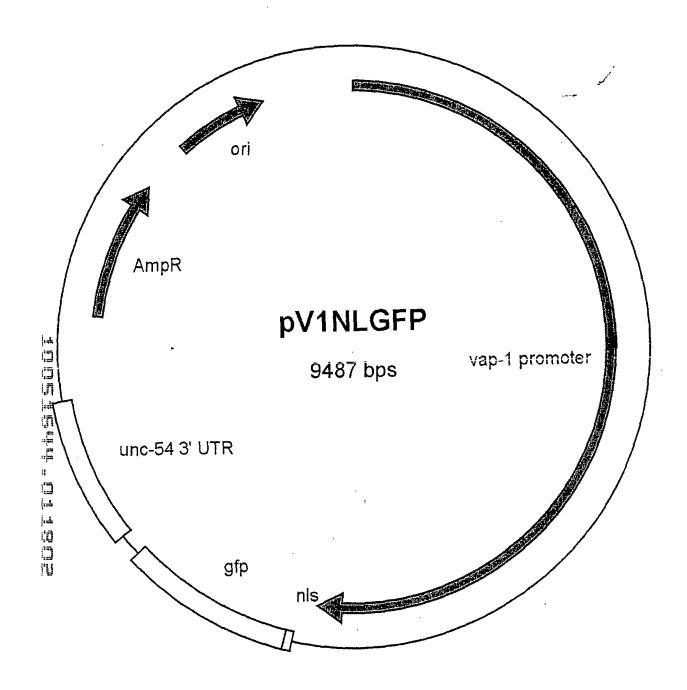


FIGURE 5A

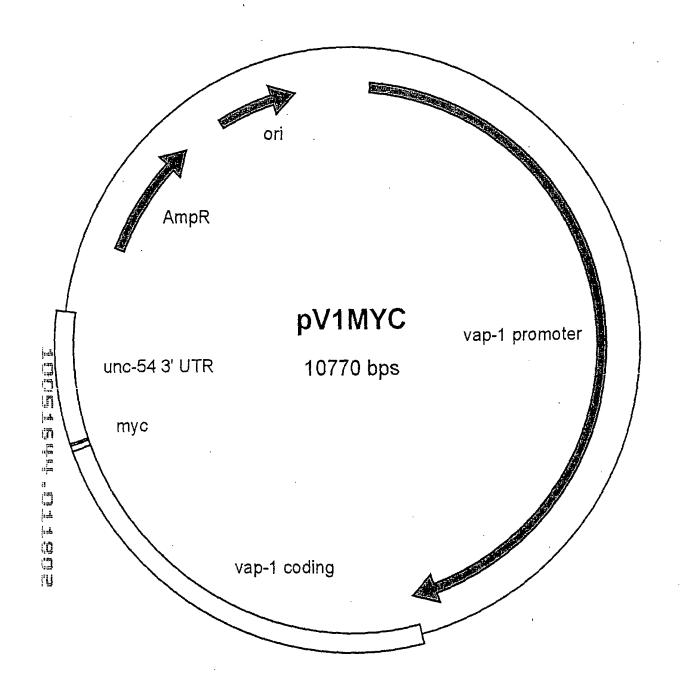


FIGURE 5B

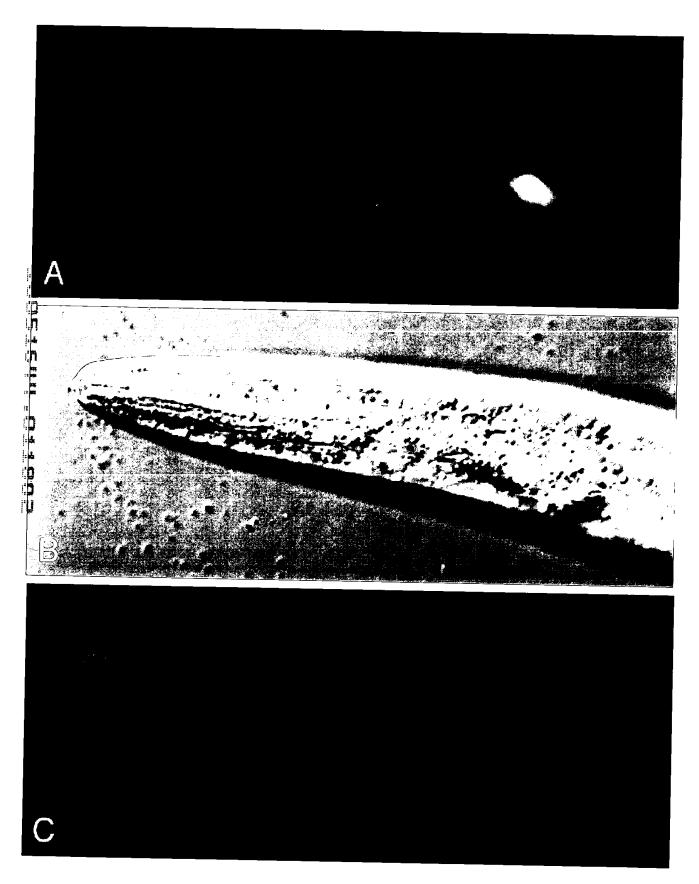


FIGURE 6

66 45

